

CLAIMS

What is claimed is:

Sub BI >

5

1. A system for molding a circuit package comprising:

a first support plate;

a second support plate proximately positioned with respect to first support plate; and

a cavity plate positioned between the first support plate and the second support plate,

the cavity plate having an aperture configured to accept a protruding portion of the circuit package.

2. The system for molding a circuit package, as set forth in claim 1, wherein the

first support plate is configured to support a plurality of circuit packages.

3. The system for molding a circuit package, as set forth in claim 1, wherein the

first support plate is comprised of a rigid material.

4. The system for molding a circuit package, as set forth in claim 3, wherein the

first support plate is comprised of metal.

Sub B2

5. ~~The system for molding a circuit package, as set forth in claim 4, wherein a film is disposed between the first support plate on the cavity support plate.~~

5

6. The system for molding a circuit package, as set forth in claim 5, wherein the film is comprised of a resilient material.

6
7
8
9
10
11
12
13
14
15

7. The system for molding a circuit package, as set forth in claim 1, wherein the first support plate is comprised of a resilient material.

8. The system for molding a circuit package, as set forth in claim 1, wherein the first support plate comprises a plateau which resides adjacent a recess in the cavity support plate.

Sub B3

9. ~~The system for molding a circuit package, as set forth in claim 1, wherein the bottom support plate contains a plurality of cavity plate push rods.~~

20

Sub B3

10. The system for molding a circuit package, as set forth in claim 9, wherein the cavity plate push rods are mechanically controlled to separate the cavity plate from the bottom support plate.

5

11. The system for molding a circuit package, as set forth in claim 1, wherein the bottom support plate contains rail ejection pins.

10
15
20

12. The system for molding a circuit package, as set forth in claim 11, wherein the rail ejection pins are mechanically controlled to separate the circuit package from the cavity plate.

13. The system for molding a circuit package, as set forth in claim 1, wherein the second support plate comprises a cavity.

14. The system for molding a circuit package, as set forth in claim 13, wherein the cavity is positioned to permit a molding compound to be disposed within the cavity.

15. The system for molding a circuit package, as set forth in claim 1, wherein the aperture is sized to create a peripheral void about the protruding portion of the circuit package to permit a molding compound to be disposed about the protruding portion of the circuit package.

5

16. The system for molding a circuit package, as set forth in claim 15, wherein the aperture is the same height as the protruding portion of the circuit package.

17. The system for molding a circuit package, as set forth in claim 16, wherein the aperture is configured to yield a circuit package having its non-protruding surfaces completely covered with a molding compound.

18. The system for molding a circuit package, as set forth in claim 17, wherein the molding compound is an insulating material.

19. The system for molding a circuit package, as set forth in claim 1, wherein the protruding portion of the circuit package is a semiconductor chip.

20. The system for molding a circuit package, as set forth in claim 19, wherein the semiconductor chip is a memory device.

5 21. A circuit package comprising:

a substrate;

a semiconductor chip having a top surface, a bottom surface, and a periphery,
the bottom surface being coupled to the substrate; and

a peripheral ring of molding compound deposited on the substrate and about the
periphery of the semiconductor chip, leaving the top surface of the semiconductor chip
uncovered.

10
15 22. The circuit package, as set forth in claim 21, wherein the semiconductor chip is
a memory device

20 23. The circuit package, as set forth in claim 21, wherein the semiconductor chip is
electrically coupled to the substrate.

24. The circuit package, as set forth in claim 23, wherein the molding compound is disposed to encapsulate a plurality of electrical connections between the semiconductor chip and the substrate.

25. The circuit package, as set forth in claim 21, wherein the molding compound is disposed upon a bottom portion of the substrate.

26. The circuit package, as set forth in claim 21, wherein the molding compound is an insulating material.

27. A method of molding a circuit package comprising the acts of:

- (a) disposing the circuit package on a cavity plate, the circuit package comprising a semiconductor device coupled to a substrate;
- (b) disposing the cavity plate on a first support plate;
- (c) disposing a second support plate on the cavity plate;
- (d) injecting a molding compound into the cavity plate;
- (e) separating the second support plate from the cavity plate;
- (f) separating the cavity plate from the first support plate; and
- (g) separating the circuit package from the cavity plate.

28. The method of molding a circuit package, as set forth in claim 27, wherein act
(a) comprises the act of disposing the circuit package on the cavity plate die-side down.

5 29. The method of molding a circuit package, as set forth in claim 27, wherein act
(b) comprises the act of disposing the cavity plate on the first support plate by mechanically
moving the cavity plate onto the first support plate.

10 30. The method of molding a circuit package, as set forth in claim 27, wherein the
cavity plate is configured to accept a protruding portion of the circuit package.

15 31. The method of molding a circuit package, as set forth in claim 30, wherein act
(b) comprises the act of disposing the protruding portion of the circuit package upon the first
support plate as the cavity plate is disposed upon the first support plate.

20 32. The method of molding a circuit package, as set forth in claim 27, wherein act
(c) comprises the act of disposing the second support plate on the cavity plate by mechanically
moving the second support plate onto the cavity plate.

33. The method of molding a circuit package, as set forth in claim 27, wherein act (d) comprises the act of injecting a molding compound into an aperture to create a peripheral ring around the semiconductor device.

5

34. The method of molding a circuit package, as set forth in claim 33, wherein the molding compound is an insulating material.

35. The method of molding a circuit package, as set forth in claim 33, wherein the molding compound is injected in liquid form.

36. The method of molding a circuit package, as set forth in claim 35, wherein the molding compound is allowed to harden after the injection process.

37. The method of molding a circuit package, as set forth in claim 27, wherein act (f) comprises the act of elevating the cavity support plate with respect to the first support plate by a plurality of cavity plate push rods, the cavity plate push rods controlled to extend from the first support plate.

38. The method of molding a circuit package, as set forth in claim 27, wherein act (g) comprises the act of elevating the circuit package with respect to the cavity support plate by a plurality of rail ejection pins, the rail ejection pins controlled to extend from the first support plate.

5

39. The method of molding a circuit package, as set forth in claim 27, wherein a film is disposed between the cavity plate and the first support plate.

40. The method of molding a circuit package, as set forth in claim 39, wherein the film is comprised of a resilient material.

41. The method of molding a circuit package, as set forth in claim 27, wherein a film is disposed between the semiconductor device and the first support plate.

42. The method of molding a circuit package, as set forth in claim 41, wherein the film is comprised of a resilient material.

20

43. The method of molding a circuit package, as set forth in claim 27, wherein the acts are performed on a plurality of circuit packages at once.

5 44. The method of molding a circuit package, as set forth in claim 43, further comprising the act of singulating the plurality of circuit packages.

45. The method of molding a circuit package, as set forth in claim 27, wherein the acts are performed in the recited order.

46. A circuit package comprising:

a substrate;

a semiconductor chip having a top surface, a bottom surface, and a periphery, the bottom surface being coupled to the substrate;

a peripheral ring of molding compound deposited on the substrate and about the periphery of the semiconductor chip, leaving the top surface of the semiconductor chip uncovered by:

20 (a) disposing the circuit package on a cavity plate, the circuit package comprising a semiconductor device coupled to a substrate;

(b) disposing the cavity plate on a first support plate;

(c) disposing a second support plate on the cavity plate;

- (d) injecting a molding compound into the cavity plate;
(e) separating the second support plate from the cavity plate;
(f) separating the cavity plate from the first support plate; and
(g) separating the circuit package from the cavity plate.

5

[illegible]